A PERSONAL APPROACH TO CHANGE

by
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Quality Initiatives

- World Class Competitiveness (WCC)
- Total Quality Management (TQM)
- Quality Circles (QC)
- Six Sigma (6-S)
- Capability Maturity Model (CMM)
- Malcolm Baldridge (MB)
- -
- -

Quality initiatives work, but are not easily adopted?

Difficult to Implement

- Resistance to change
- Directed by management
- Lack of buy-in and belief
- Lack of time and interest
- High learning curve
- Needs large infrastructure & maintenance
- Cumbersome, inefficient, more than needed
- Costly
- Lack sponsorship

Quality initiatives have been called failures

Five Steps to Implement Change

1. The unhappy reality: My workgroup in the early days
2. Imagining how it could be better
3. Deciding to change: First things first
4. Searching for the causes
5. Solutions in the making

1. The unhappy reality: My workgroup in the early days

- Continual “fire-fighting”, working on one crisis after another
- Little time for improvements or learning new skills
- Unprepared or presented bad news to management and customers
- Overwhelmed with work and excessive overtime
- Dissatisfied with job

2. Imagining how it could be better

- Produce high quality software, on time and on budget
- Envision strong focus on processes with few problems
- Work with highly skilled and motivated employees
- Use my technical and leadership skills better
- Achieve personal success:
  - job security
  - promotion
  - higher pay

3. Deciding to change: First things first

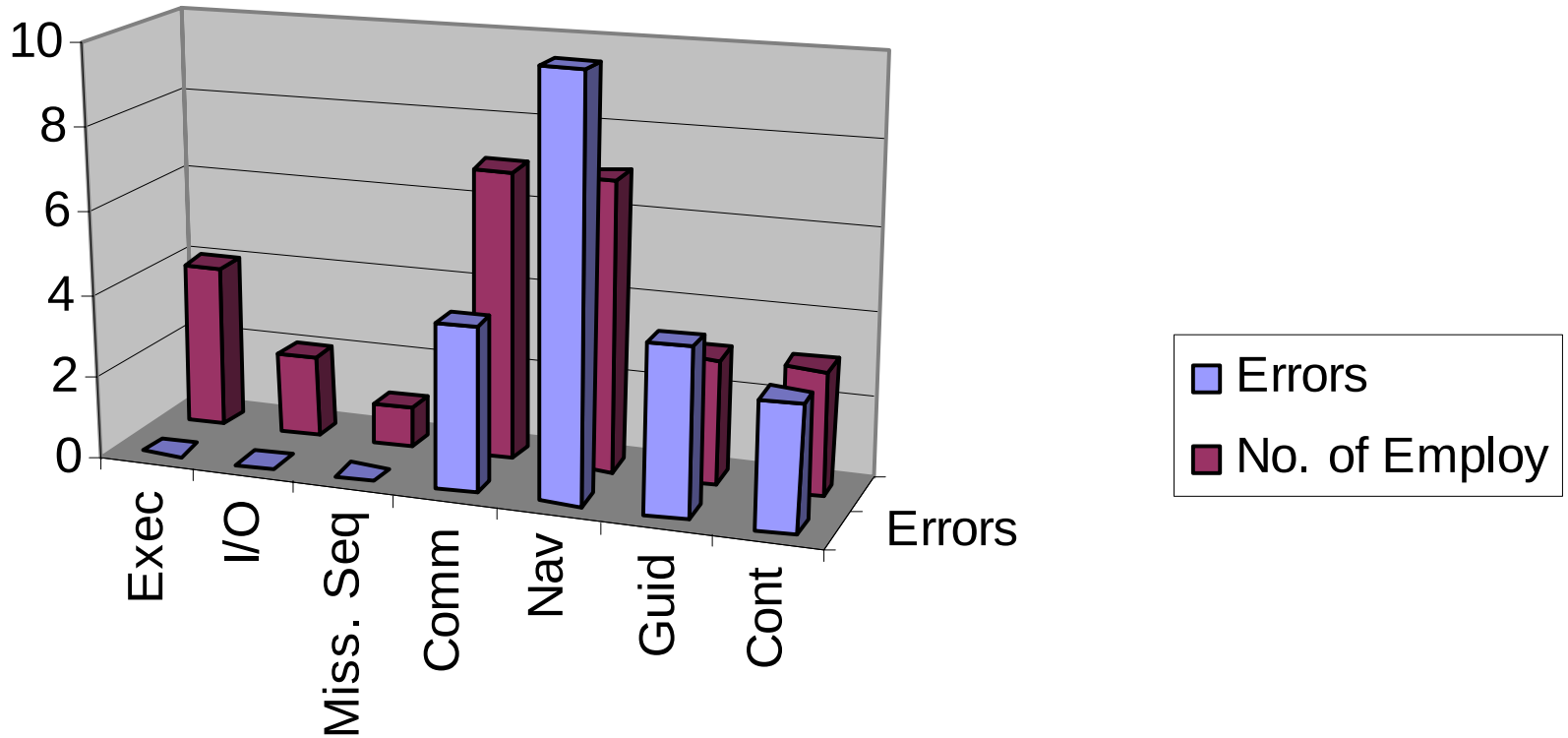
- Uncertain about my job and scope of responsibility
  - Document description of job
  - List responsibilities, accomplishments, barriers
  - Review with my manager
- My workgroup resisted making changes
  - Find a common team goal
  - Use data from a team survey
  - Select positive, motivated employees
  - Empower team to implement changes
- Needed to improve productivity
  - Had too many defects
  - Caused rework
  - Employees were frustrated

4. Searching for the causes

Example: Finding the cause of defects

1. When do the defects occur?
   High correlation to high work load and multi-tasking
2. What areas have the most defects?
   High correlation to highest turnover of employees
3. Why do we have high turnover?
   Employees change jobs for career growth
4. Why do new hires make more mistakes?
   Training was inadequate

Errors Correlated to Turnover



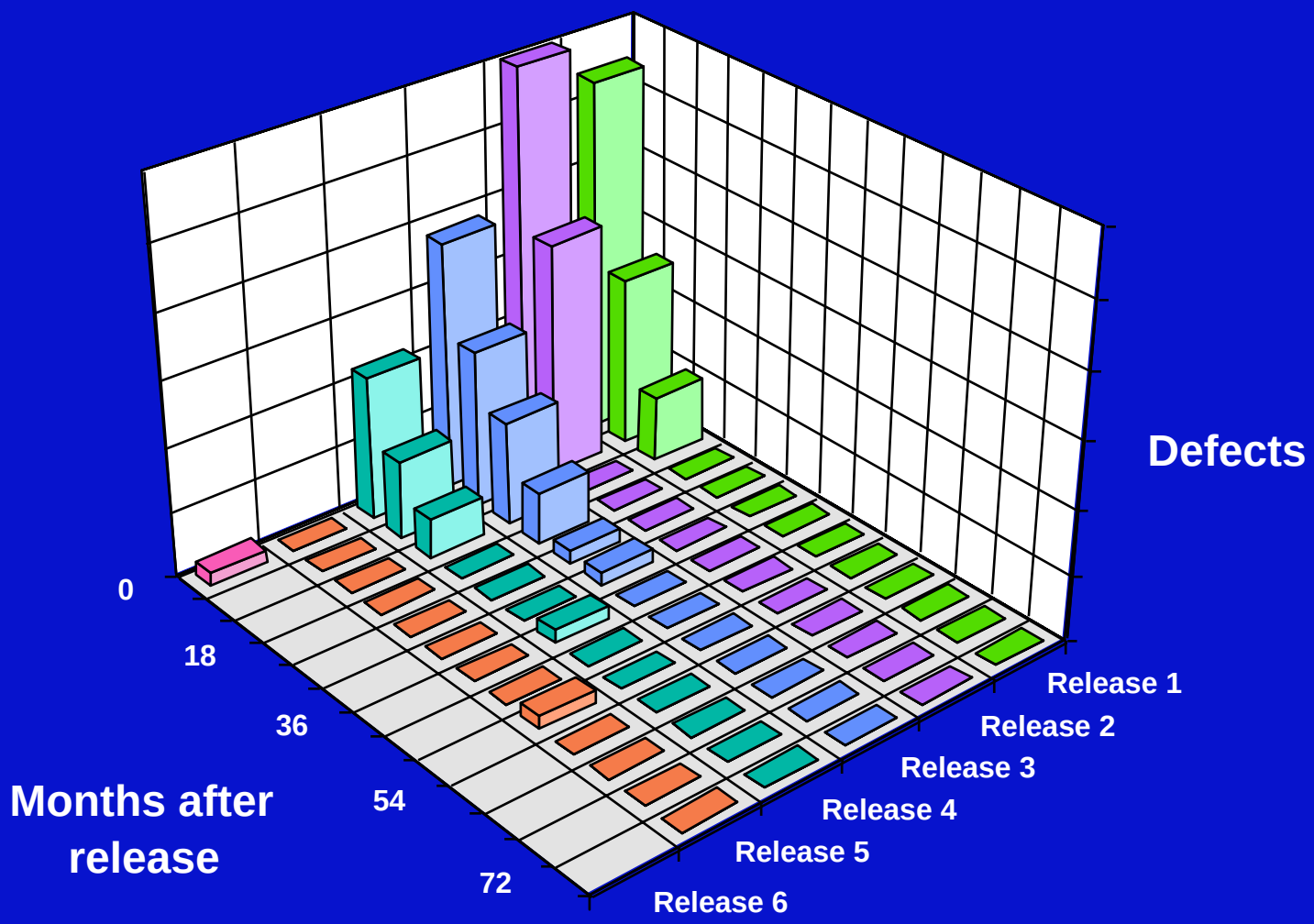
5. Solutions in the making

Multi-tasking	Task load matrix
Defects	Accountable reviews
Turnover	Special assignments or job Rotation
Training	Spread training over 12 weeks

Task Load Matrix

Task	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Task A: Person a	.5	.5	.5	.5	.5	.5							
Person b	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Person c	.1	.1	.1	.1	.1	.1							
Task B: Person d	.8	.8	.8	.8	.8	.8	.8	.8	.8	.8	.8	.8	
Person e	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Task C: Person a	.5	.5	.5	.5	.5	.5	1.0	1.0	1.0	1.0	1.0	1.0	
Person d	.2	.2	.2	.2	.2	.2	.						
Person f	.3	.3	.3	.3	.3	.3							
Task D: Person c	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	
Task E: Person d								.2	.2	.2	.2	.2	
Person f	.7	.7	.7	.7	.7	.7	1.0	1.0	1.0	1.0	1.0	1.0	
Total Work Load	6.0	6.0	6.0	6.0	6.0	6.0	5.7	5.9	5.9	5.9	5.9	5.9	

Defect History from Product Testing

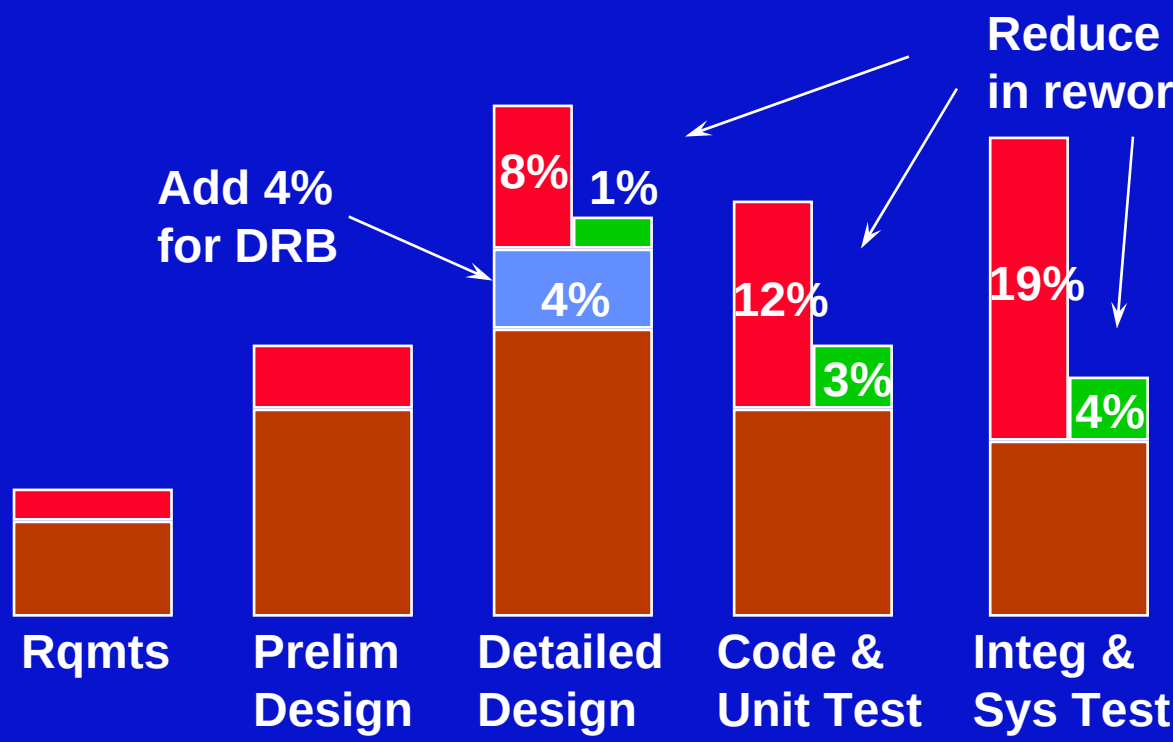


Why This Works

- Focus on value-added benefits
- Encourage employee involvement to achieve team goals
- Emphasize leader’s role for productive employees
- Employs processes to optimize operations

Results of Improvements

Cost:Benefit Ratio

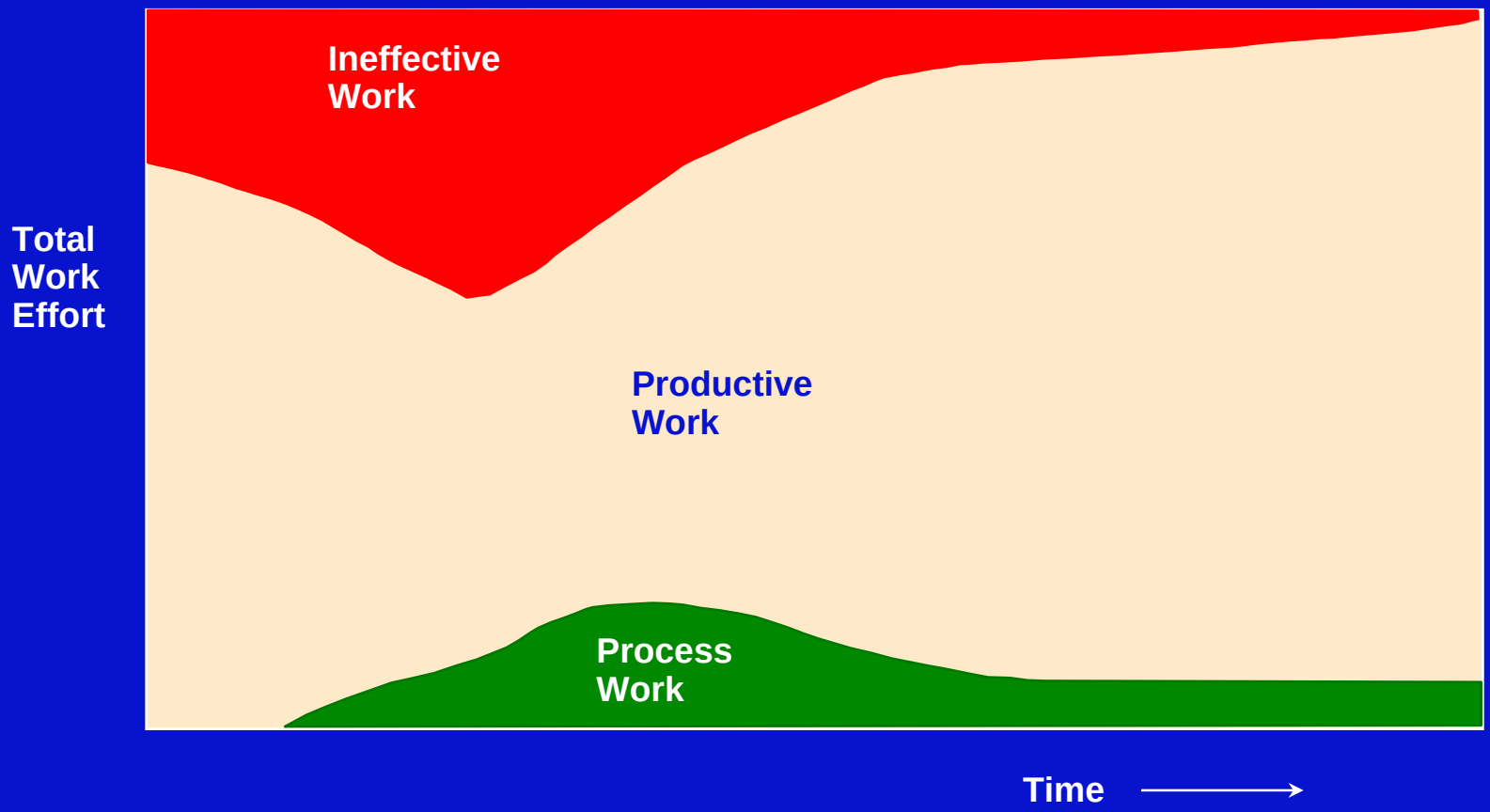


Implementing DRB increased design effort by 4%

Rework effort was reduced in Verif from 64 to 7 defects = 7%
Valid from 17 to 4 defects = 9%
Oper from 10 to 2 defects = 15%
31%

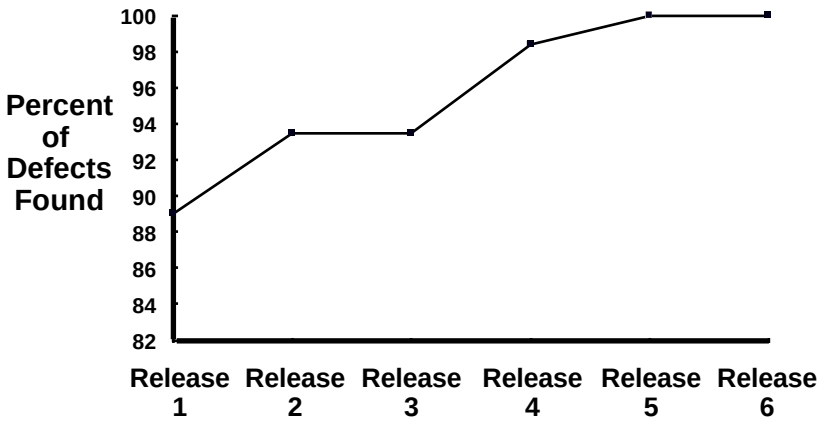
Cost: Benefit ratio is 4% : 31% or 1 : 7.75

Process Effort Returns Benefits (ROI = 7)

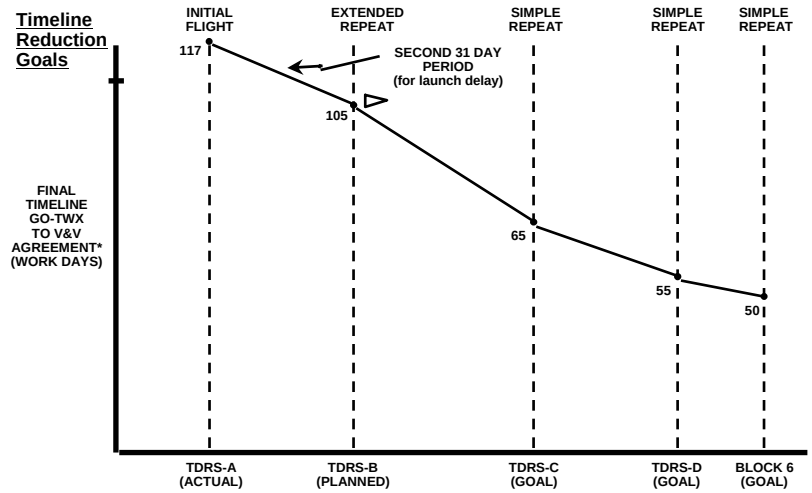


Achieved Significant Results

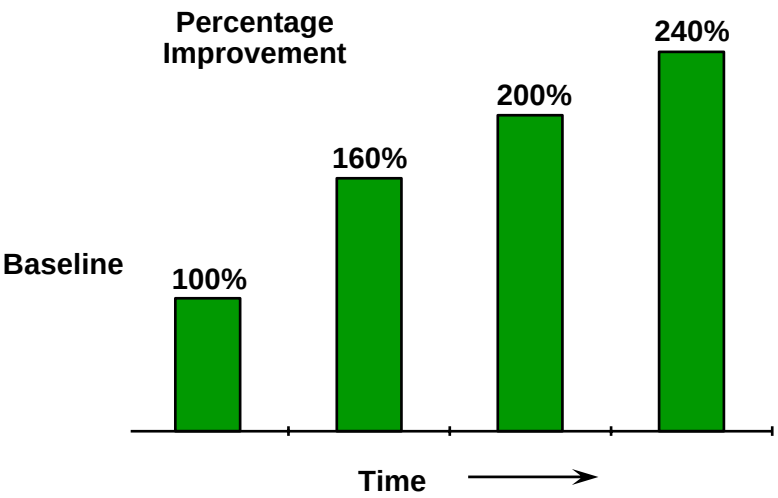
Quality



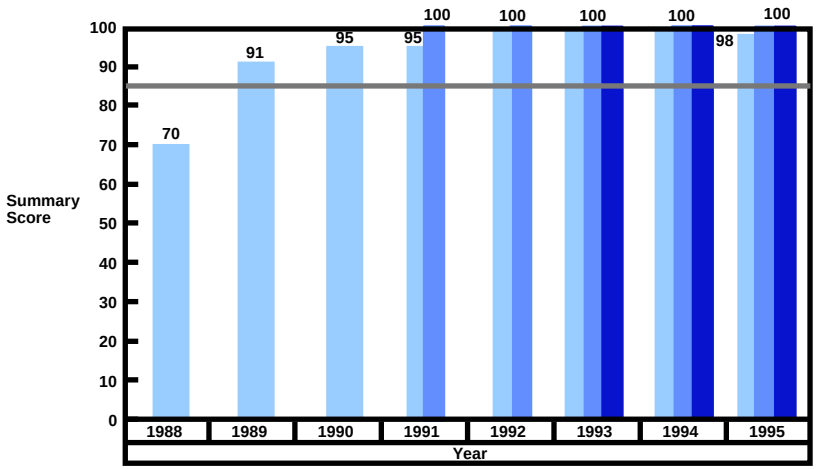
Cycle Time Reduction



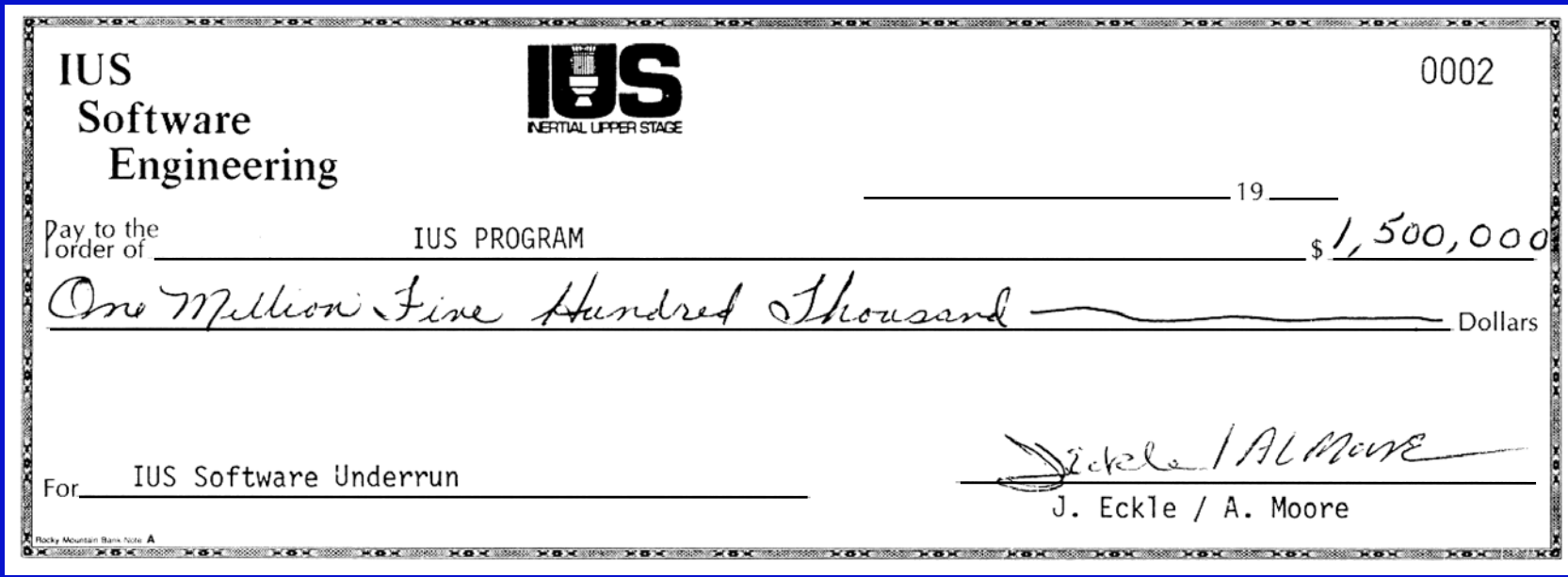
Productivity



Customer Satisfaction



Benefits Shared with Customer



IUS
Software
Engineering

INERTIAL UPPER STAGE

0002

_____ 19____

Pay to the order of IUS PROGRAM $ 1,500,000

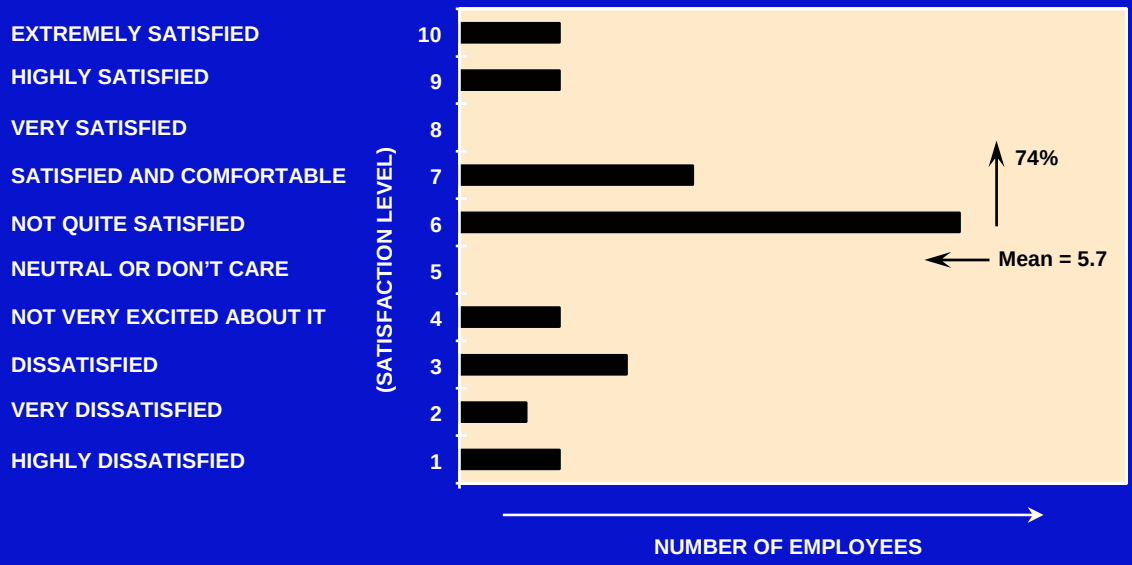
One Million Five Hundred Thousand _____ Dollars

For IUS Software Underrun

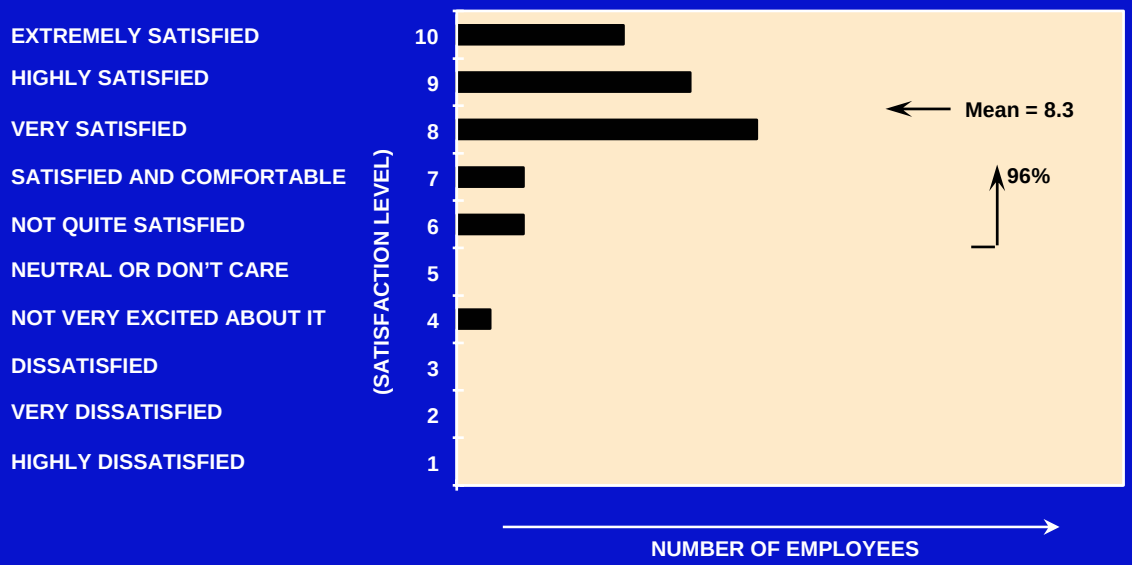
J. Eckle / A. Moore

Rocky Mountain Bank Note A

Employee Satisfaction Increased

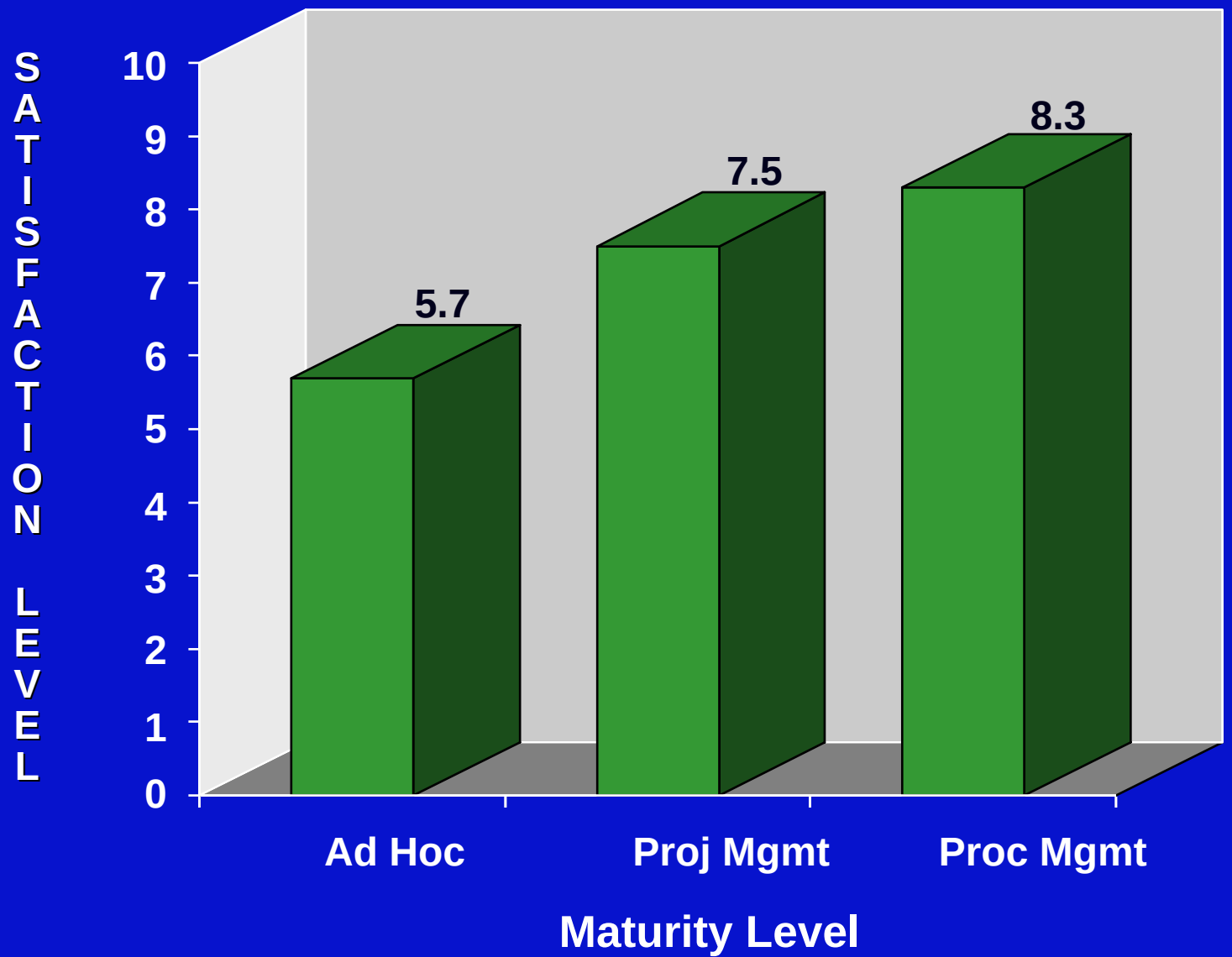


Before Process Improvement Activities



After Process Improvement Activities

Employee Satisfaction Increased with Maturity Level



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- SEI CMM Level 5 - A Practitioner's Perspective
  www.stsc.hill.af.mil/CrossTalk/1997/09/index.html
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  www.stsc.hill.af.mil/CrossTalk.1997/11/index.html
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- Process Improvement Satisfies Employees, IEEE Software, Sept/Oct 1999, Page 83

Tools and Techniques

Practical Leadership Techniques

Situation	Technique
• Changing a culture is difficult	3–Questions
• Ideas are easy, implementing is difficult	RSST – Right thing Small steps Simple Timing
• Not enough time	Time Allocation Analysis
• How to address employee needs	Conversation Checklist
• Too much fire-fighting	Process Focus Steps
• Need to emphasize employee growth	Skill Profile Employee Rewards

Practical Leadership Techniques (cont.)

Situation	Technique
• Lack commitment follow-through	• Document commitment
• Unclear organization vision	• Goals framework
• Too much work	• Task management matrix
• Unmotivated employees	• Job value discussion
• Inadequate reviews	• Accountable reviews
• Budget overrun	• Power of data
• Unclear job duties	• Reverse performance mgmt.
• Poor estimating process	• Management accountable
• Negotiate with customers	• Defect metric

Time Allocation Analysis

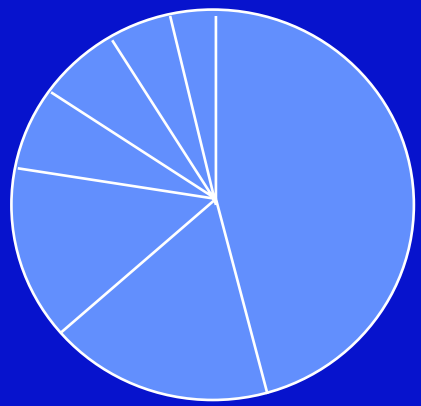
Time Log

Week ___

___	___	___	___
___	___	___	___
___	___	___	___
___	___	___	___

For inefficient time use.
Don't know how time spent.
Keep weekly time log.

Time Distribution Profile



Determine time distribution.
Look for waste, e.g.,
don't get cc'ed on all e-mail

Skill-Task Matrix

Position Critical Task

Requires My Skill	Y	N
Y	A	C
N	B	D

Categorize tasks as A,B,C,D
Delegate tasks in D.
Mentor others in B & C

Skill-Task Matrix

Requires My Skill	Position Critical Task: Yes	Position Critical Task: No
Yes	**A** I have the best skill and it is my job as the leader	**C** I have the best skill, but I'm not the only one who has to do the task
No	**B** I'm not the only one skilled to do the job, but It is my leadership responsibility	**D** Others have the skill and can do the task

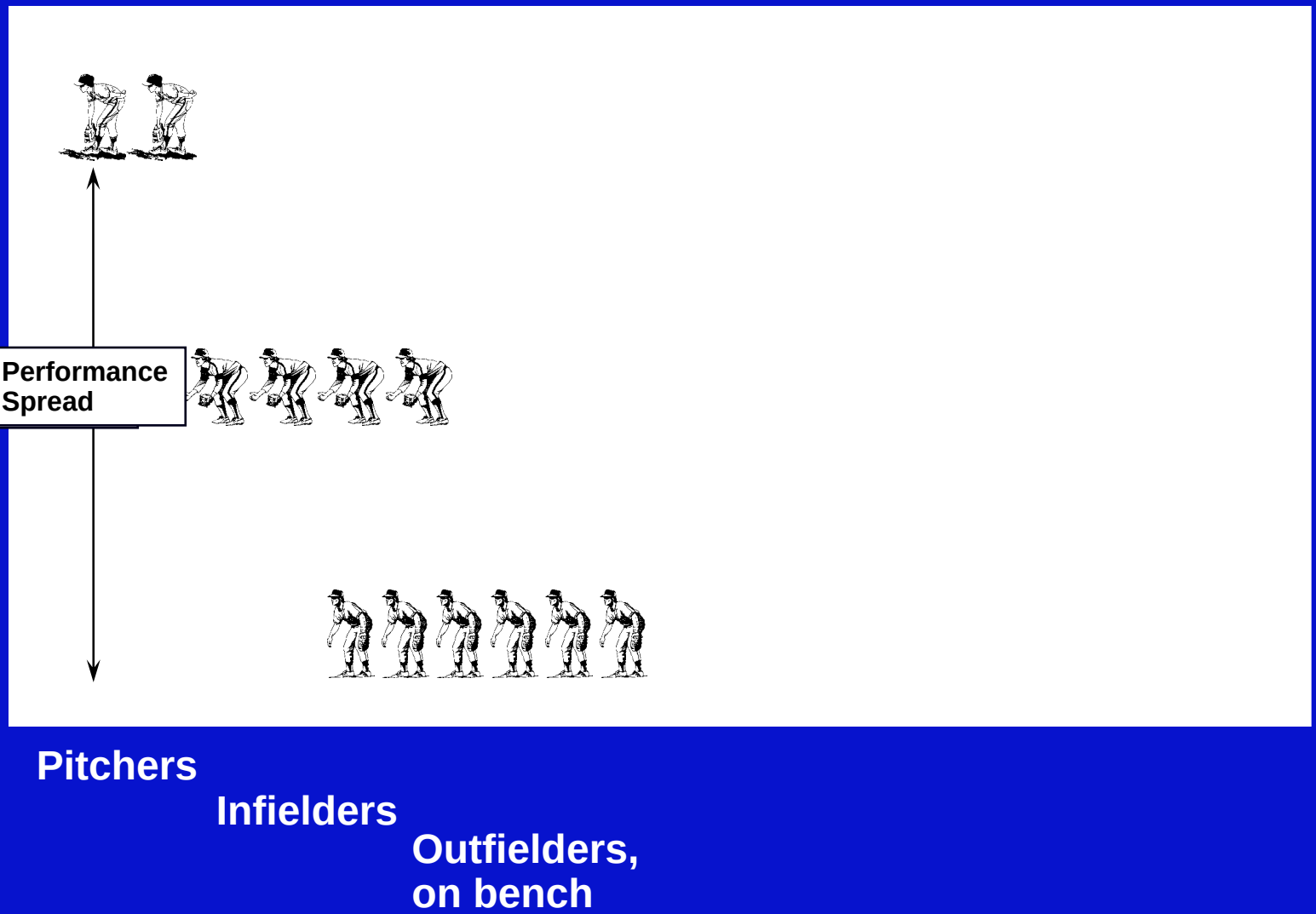
Systems & Software Engineering

Staff Qualifications Guidelines (Preliminary)

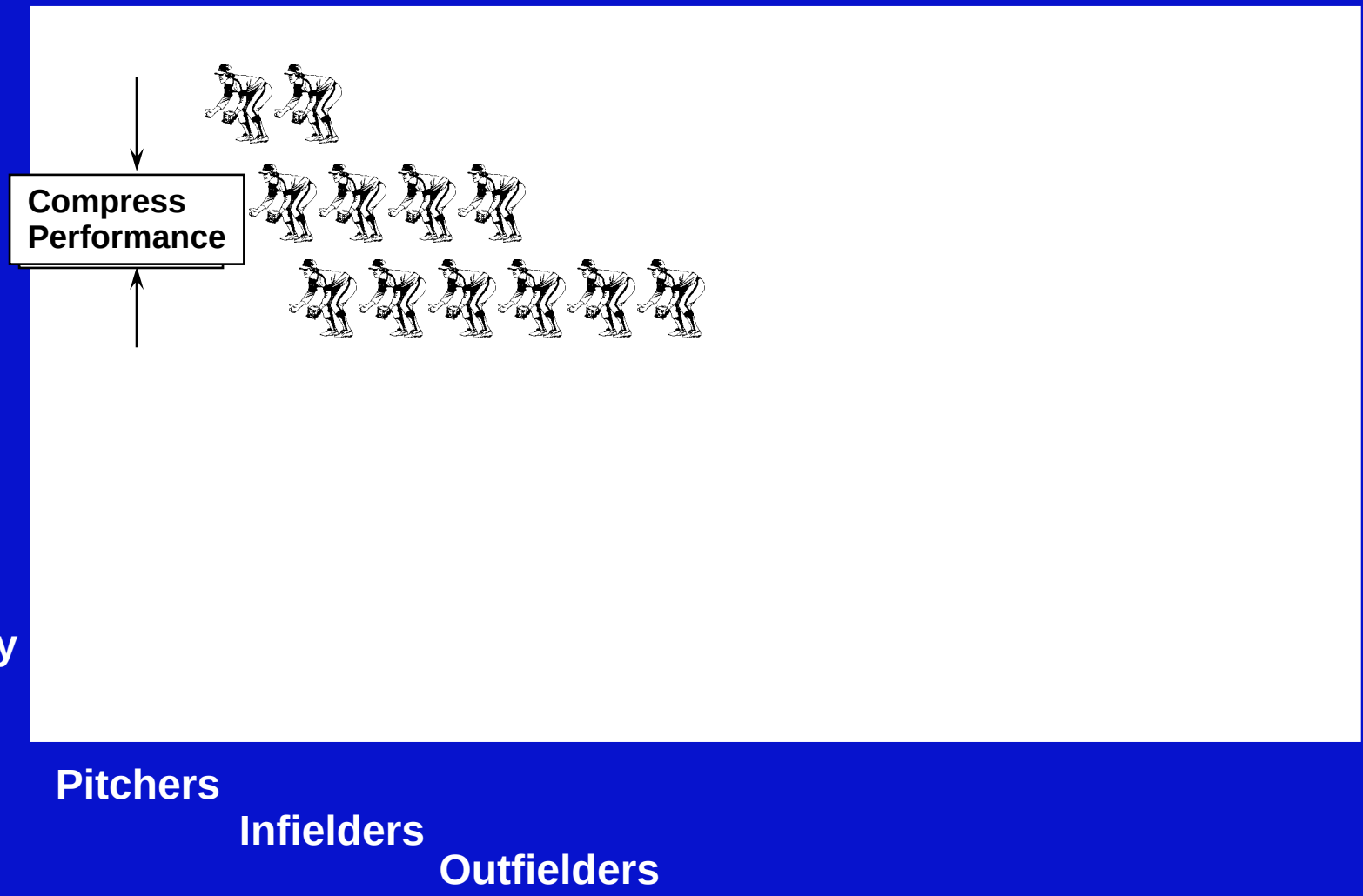
Boeing Aerospace & Electronics

Dimension	Entry Level Engineer	S/W Designer	System Engineer	S/W Manager	SE Manager	Chief Engineer	Program Manager
Knowledge	•1 High Level Lang. •1 Assembler Lang.	•S/W Engr Process •Ada •DoD Software requirement	•Engr Process •Structured Dsgn •Product Design Teams •Large Scale Integration	•Engr Process •Program Planning •Life Cycle Phases •Standards	•MIL-S-499A •Boeing SE Progress •At least 2 •Knlwdg. of SW Process	•Sys Overview •DoD SW Overview •Conversant In most domains •SE Process	•Overview - DoD •Conversant In most domains •Sys. Overview •SE Process
Skills	•Design Methods •Code in 2 Lang. •Testing Theory •Write competently	•Design Methods •S/W Engr Disciplines •Test •Requirements •Writing Skills	•Modelling/ Prototyping •Analytical Techniques •Teams	•Estimation •Identify Org. Trng. Needs •People Skills	•Spec Devlp. •Appropriate Project Experience	•Tech Problem Solving •Team Bldg. •Comm. Skills •Resource Allocation	•Policy Making •Bus. Skills •Senior Leadership •Resource Allocation •Comm. Skills
Education & Training	•B.S. Engr •B.S. Computer Science	•S/W Engr Principles •DoD S/W Requirements •Standards •Communication	•Sys Engr Prncpl •Cross Functl. Training •Tech. Currency •Archit. Analysis •Communication	•Sys Engr Process •SW Prjt Mgmt •Tech Currency •Metrics •Communication •Mgmt Stds.	•Technical Currency •SE Process •Communication	•Technical Currency •Mgmt. Skills •Communication •SE Mgmt. Exp.	•Technical Currency •Adv. Mgmt. Skills •Communication •SE Mgmt. Exp.
Recommended Systems/or Software Experience	•None Req'd •Some is advantage	2 yr.	4 yr.	8-12 years 2 project	8-12 years 2 projects	18-20 years 3 projects	18-20 years 4 projects

Team Capability Example



Improved Team Performance



11 & 12 YR OLD		BAT	FIELD	RUN	FLY	TOTAL		10 YR OLD NAME	COMMENTS
1130	JACOBSON, STEV	10	9	3.3	10	25.7			LEFT, GD FORM
		10	9	3.5	10	25.5	1016	[redacted], LEE	GD ARM, FORM, SPED — 5, M (Freeze)
1226	[redacted], WILSON	10	9	3.6	10	25.4			GD ARM, FORM, SWNG
1161	MARK, JASON	9	10	3.8	10	24.8			GD ARM, FORM, PWR
1145	[redacted], MIKE	8	10	3.3	10	24.7			LEFT, GD ARM, HIT
		9	9	3.2	10	24.0 3	1038	[redacted]	GD FORM, JUDGE — 2, P
1173	KERCHOFF, STEVE	8	10	4.1	10	24.0			GD FORM, STRNG, BIG
1138	MITCHELL, MATT	9	9	3.8	10	23.8			GD ARM, HIT
		8	9	4.0	10	23.1 2	1014	DOLAN, JEFF	GD SIZE, FORM, PWR — 2, M
		7	9	3.5	10	22.5 1	1061	[redacted]	GD SWG, SWITCHR — 1, P
1101	ALBRIGHT, JETH	7	9	3.5	10	22.3			GD ARM, FORM, BIG
		8	7	3.1	10	22.1 6	1015	EATHORNE, BURKE	LEFT, CATCHER (TOO HIGH) — 1.M
1133	KASIN, PHILLIP	7	9	4.1	10	21.8			GOOD FORM
1171	[redacted], JACOB	8	8	4.0	10	21.8			GOOD FORM — 4, P
1142	NEUMAN, MARK	6	9	3.6	10	21.7			GD FORM, ARM. SMALL
1150	SCHULTZ, BRYAN	7	9	4.0	10	21.7			GD FORM
1109	COLON, CHRIS	7	8	3.6	10	21.4			GD HIT, HARD HIT
		8	7	4.0	10	21.3 7	1038	ROSBACH, BRIAN	GD FORM — 3, P
1146	POLICAR, DAVID	8	7	3.7	10	21.1			ALL ARM, WEAK SWG
		9	7	3.8	8	21.1 8	1059	WIRRICK, MIKE	GD FORM, SIZE (TOO HIGH) — 1, T
1110	CONKLIN, ADAM	7	8	4.1	10	20.8			UNSET AT BAT
		9	8	3.5	8	20.8 4	1002	BIRDS, STEVE	LEFT, GD ARM, FORM — 1 B
1236	HIXSON, CHRIS	9	8	4.0	8	20.6			GOOD FORM
1151	ST MARIE, GREG	8	9	4.0	8	20.5			GD ARM, FORM
1119	GRANVILLE, ERNI	8	8	3.6	8	20.5			LEFT, 2 MANY STEP
1128	HUSON, MARK	8	7	4.0	10	20.5			LEFT, GD FORM
		8	8	4.0	8	20.5 9	1037	RITTENHOUSE AD	GD FORM, SMALL — 2, B
1228	BURBRIDGE, NOEL	6	8	3.8	10	20.2			GD FORM
1136	MANNER, JASON	9	7	4.0	8	20.0			HARD HIT
		7	9	3.8	8	19.7	1031	[redacted], DAVID	BIG, GD FORM — 5, P (Freeze)
1108	COLOBRASSI, MIK	7	7	4.1	10	19.7			WK THROW, BACK OUT
1160	HAWKES, SHANE	8	8	3.8	8	19.6			GOOD FORM
		9	7	4.5	8	19.4 10	1034	PITT, DAVID	GD FORM — 2, T
1105	BARUFFI, ADAM	7	7	4.0	10	19.4			LEFT, BIG, ALL ARM
1164	GUTERREZ, SHANE	5	8	3.7	10	19.3			GOOD FORM, BIG — ~~4~~ 3, P Freeze

Huskies		Braves		Tigers		Pirates		Dodgers		Mariners	
GREEN	18.7	BIRDS	20.8	WIRRICK	21.1	DESHAZER	22.5	JOHNSON, TOM	19.1	EATHORNE	2
NEELY-CHEATLE	17.2	RITTENHOUSE	20.5	PITT	19.4	PATELLI	24.0	BENTHIN TYLER	14.3	DOLAN	23
LOVE	15.4	[SMITHBURN]	6.6	TAKEUCHI	19.2	ROSBACH	21.3	BRANSTETTER AARON	19.3	COLOSI	14
BENESON	18.2	STECKLER	0	CARPENTER	9.0	FELD	21.8	GUTIERREZ SHANE	16.3	THOMPSON	15.
DANCE	16.4	JOHNSON, C SPRING	11.2 14.2	FAULMAN	13.6	OSWELL	19.7	CRISSOM TAD	5.7	EVANS	25.
FASSIO	12.3	~~JEFFERYS~~	~~18.0~~	SCHEIB	14.9	WOJTACHA	16.1	HYNEMAN RANDY	12.1	BODEN	18.
HULBERT	9.1	CAMERON	15.4	O'BANION	16.9	JOHNSON, C SPRING	11.2 ~~14.2~~	[LACKEY] TAD	4.6	COUR	12.
DAGG	11.9	JOHNSON, J	15.4	McCALVEY	14.4	YAMAMURA	9.1	VIERLING, JASON	11.5	BOETTCHER	8
ROBERTS	NO	MAINELLA	13.4	AUTRY	12.2	BAUER	13.0	COOPER KEVIN	9.2	FREEMAN	15.
NELSON	15.2	BODINE	13.0	~~KIEFER~~	11.3	PANDER	14.7	HITCHCOCK MARK	2.5	KLASEY	12.
ROBERT	7.0	TAYLOR, R	10.6	NUNE	8.3	PRZYKOP	14.6	JEFFERSON STEVE	11.0	RIFKIN	13.
KOMORNER	14.2	TAYLOR, A	5.7	LIAND	7.5	LYKKEN	10.0	LOWELL JOSH	10.0	ANDERSON	9.
		MORGAN, J	6.0			YOUNG		ROCHE, JUSTIN	15	HOWE, M	4.0
	165.6		153.6		167.8		198		135.6		189.7
					4		+ 17				
					171.8		215				

Program Example

Employee Questionnaire

1. What is your current job satisfaction level?

1.
- 10 Extremely satisfied
- 9 Highly satisfied
- 8 Very satisfied
- 7 Satisfied
- 6 Not quite satisfied
- 5 Neutral/ don't care
- 4 Not very excited
- 3 Dissatisfied
- 2 Very dissatisfied
- 1 Highly dissatisfied

2. What is most important to you about your job?

2.

___ Achievement & Recognition	-(driven by accomplishment)
___ Advancement & Growth	-(desire growth potential)
___ Relationships	-(team dynamics is important)
___ Salary	-(only pay matters)
___ Security	-(regular income is most critical)
___ Supervision	-(work for someone I respect)
___ Work Assignment & Responsibility	-(must love my work)
___ Work Environment	-(need nice work area)
___	

3. What are the biggest issues or greatest barriers to improving your organization?

3.

a._____

b._____

c._____

_____

Questionnaire Results - Example

1. 10 Extremely satisfied [
   9 Highly satisfied [X
   8 Very Satisfied [XXX
   7 Satisfied [XXXXXXXXXX
   6 Not quite satisfied [XXXXXXXXX
   5 Neutral/don't care [XXXX ---------- 5.4 average
   4 Not very excited [XXXXXXX
   3 Dissatisfied [XXXXX
   2 Very dissatisfied [XXX
   1 Highly dissatisfied [

2.

	No. 1	No. 2	No. 3	Summary
Achievement & Recognition	**8**	**3**	**7**	**37**
Advancement & Growth	**7**	**5**	**4**	**35**
Relationship	**2**	**3**	**4**	**16**
Salary	**2**	**10**	**6**	**32**
Security	**4**	**3**	**3**	**21**
Supervision	**0**	**2**	**5**	**9**
Work Assignment & Responsibility	**21**	**11**	**0**	**85** ← **#1**
Work Environment	**1**	**1**	**8**	**12**

3. Areas for Improvement

1. Management (41)
2. Teamwork (13)
3. Training/mentoring (11)
4. Processes (11)
5. Interfaces/Communication (9)
6. Resources (7)

Major Themes - Example

- Processes not followed
- Work dissatisfaction
- Lack of buy-in from employees
- Multi-tasking, overworked
- Always fire-fighting, unpredictable

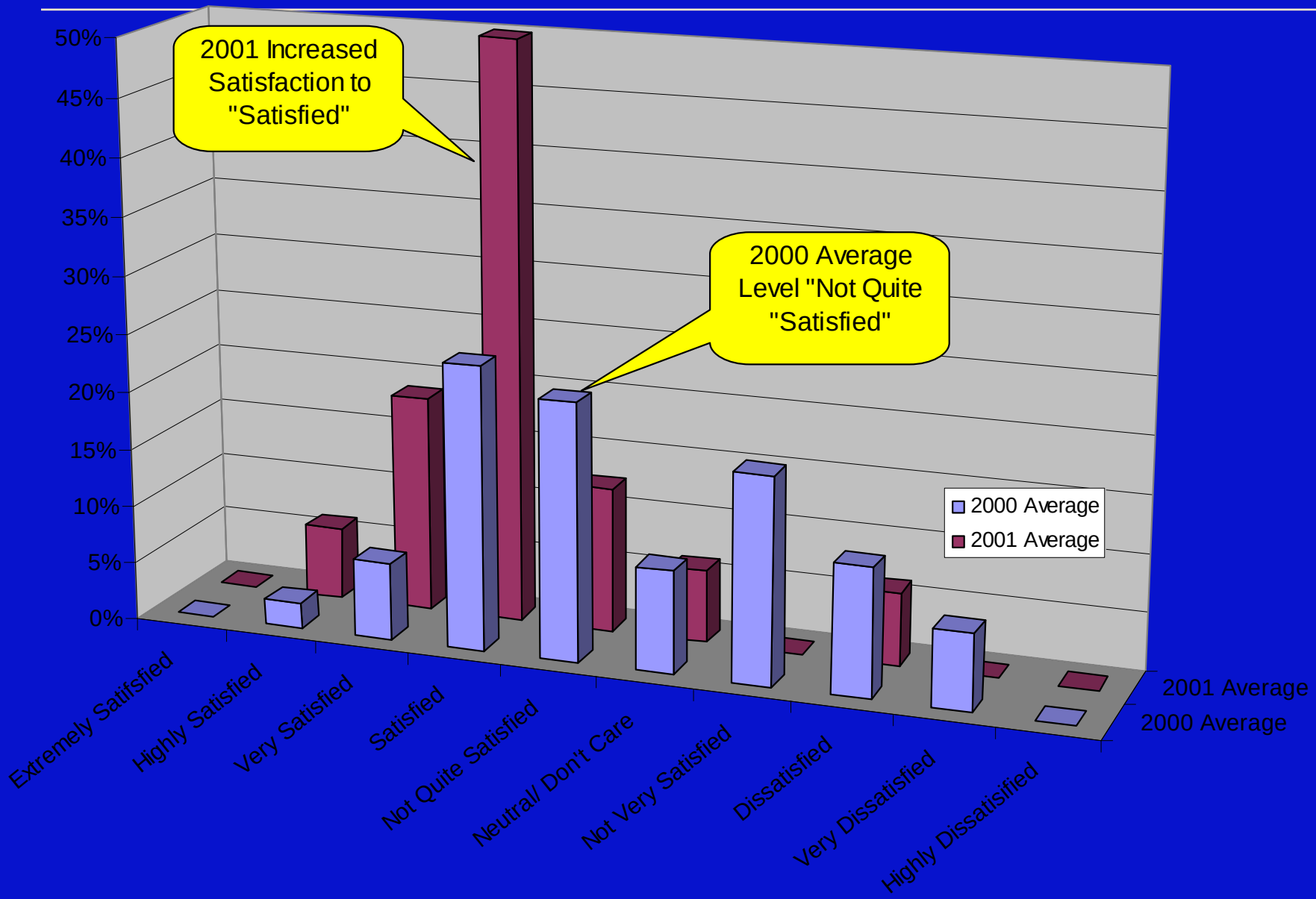
Steps Taken (60 Days)- Example

- Process training - Held four process training sessions
- Management commitment - Manager stated commitment for process improvement, committed budget, hired a process consultant
- Follow processes - Manager emphasized & will enforce
- Improve meeting/training - State purpose, start on time, peer review material
- Reorganization - Released updated organization chart

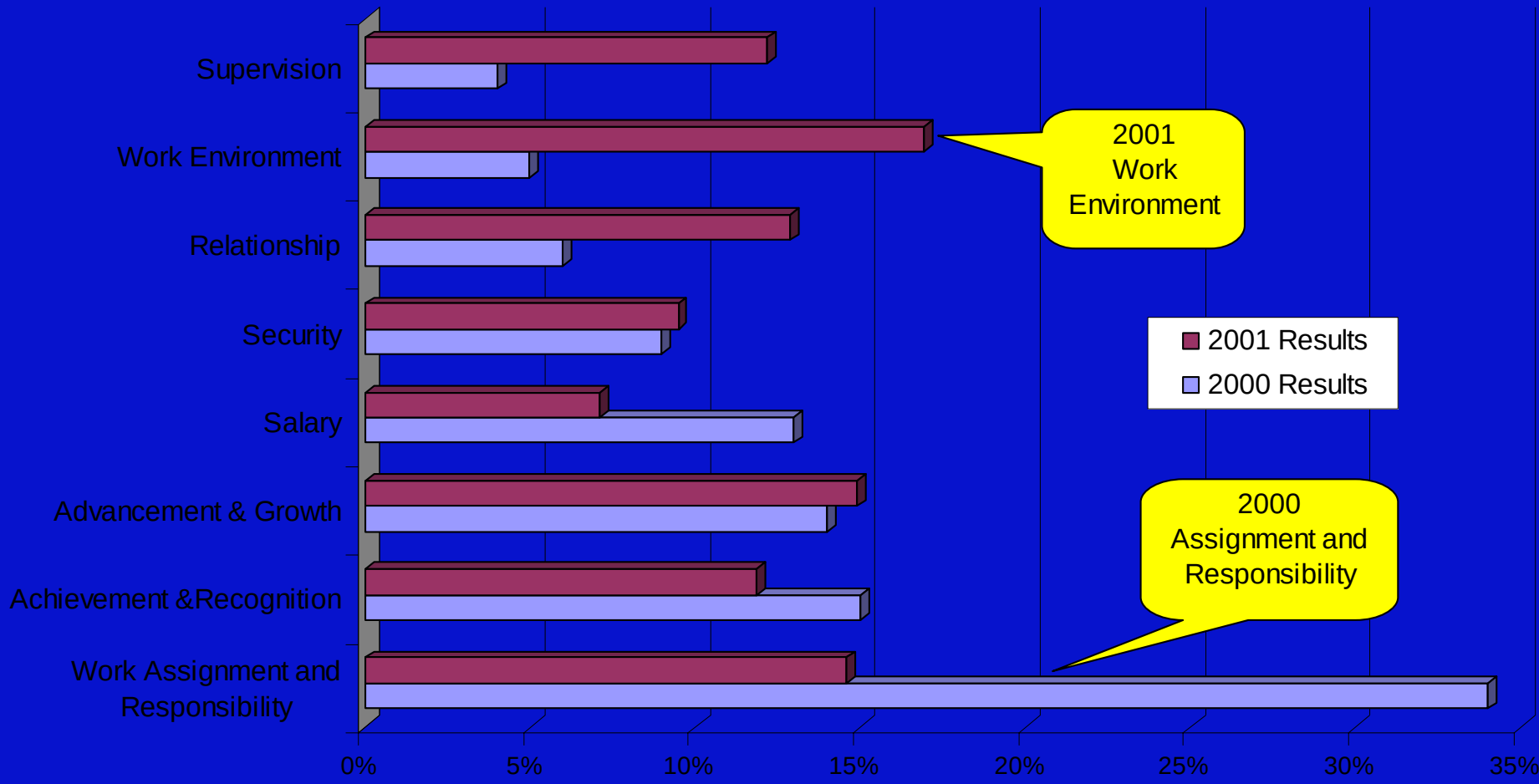
Improvement Focus (12 Months) - Example

- **Requirements Stability - Use quality gate reviews, track volatility, measure improvement**
- **Estimating Process - Improve estimating process, analyze real data, validate results**
- **Improve processes - Review and implement improvement suggestions.**
- **Management accountability - Documented commitment and follow through**

Job Satisfaction Level

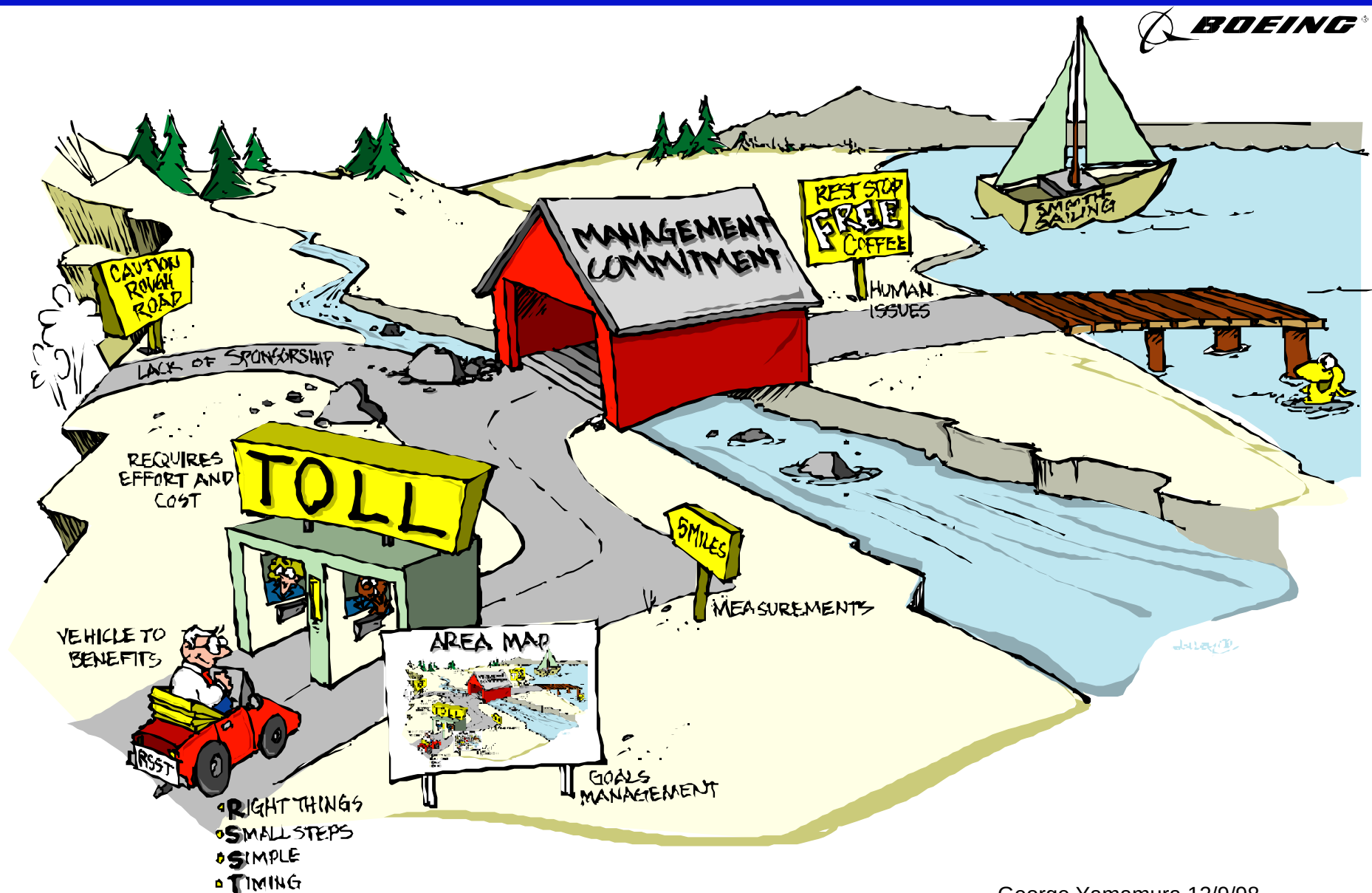


Most Important to Employees



References

The Journey

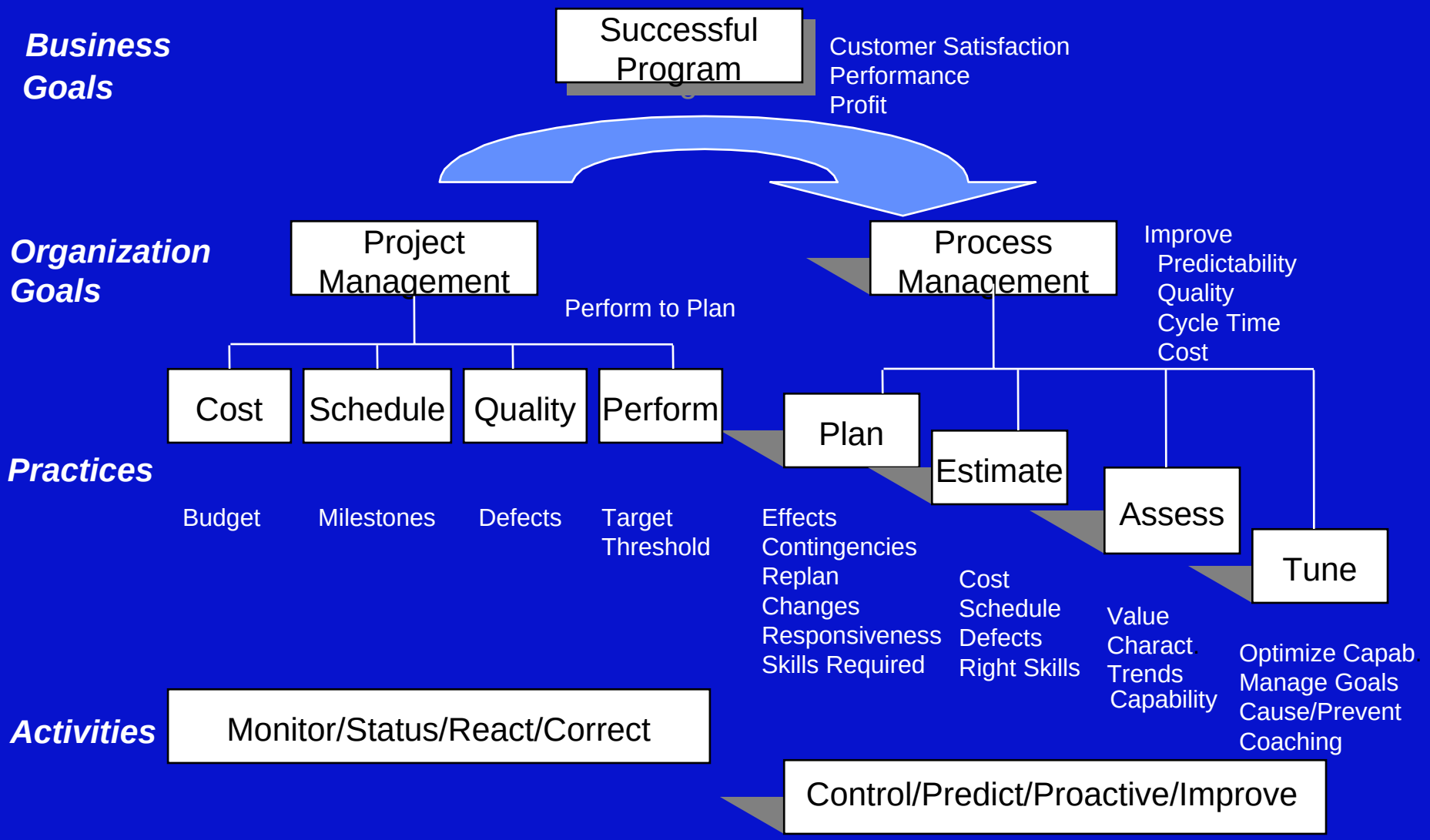


George Yamamura 12/9/98

Formula for Success

- Apply *RSST*:
  - Right Thing - Do the right thing for the situation, understand the problem/capability
  - Small Steps - Take small, do-able steps, get a success, look for highest value item to change
  - Simple - Keep it simple, look for the simple solution, use common sense, don't just follow the trend
  - Timing - Right timing is critical, when environment is right, able to apply right strategy

Process Management Evolution



Effective Leadership

- **Did you make your decision from facts and data?**
  - State the:
    1. Fact
    2. Data
    3. Goal
    4. Decision
- **Did you apply process management?**
  - Map the:
    1. Goals
    2. Plans
    3. Processes
    4. Metrics
- **Did you recognize the human issues?**
  - Remember to:
    1. Ask
    2. Listen
    3. Act
    4. Feedback
- **Did you apply RSST to make a difference?**
  - Do:
    1. Right thing
    2. Small steps
    3. Simple
    4. Right timing
- **Did you keep team members accountable?**
  - Have:
    1. Documented commitment
    2. Real ownership
    3. Continued awareness
    4. Visible recognition

References

- “A Personal Approach to Change” – A workbook
- “Tools and Techniques” – A handbook of tools
- “Leadership Style to Foster Change” – A story
- “10th Inning, Winning Strategies in Baseball and Business” – A guide book of lessons